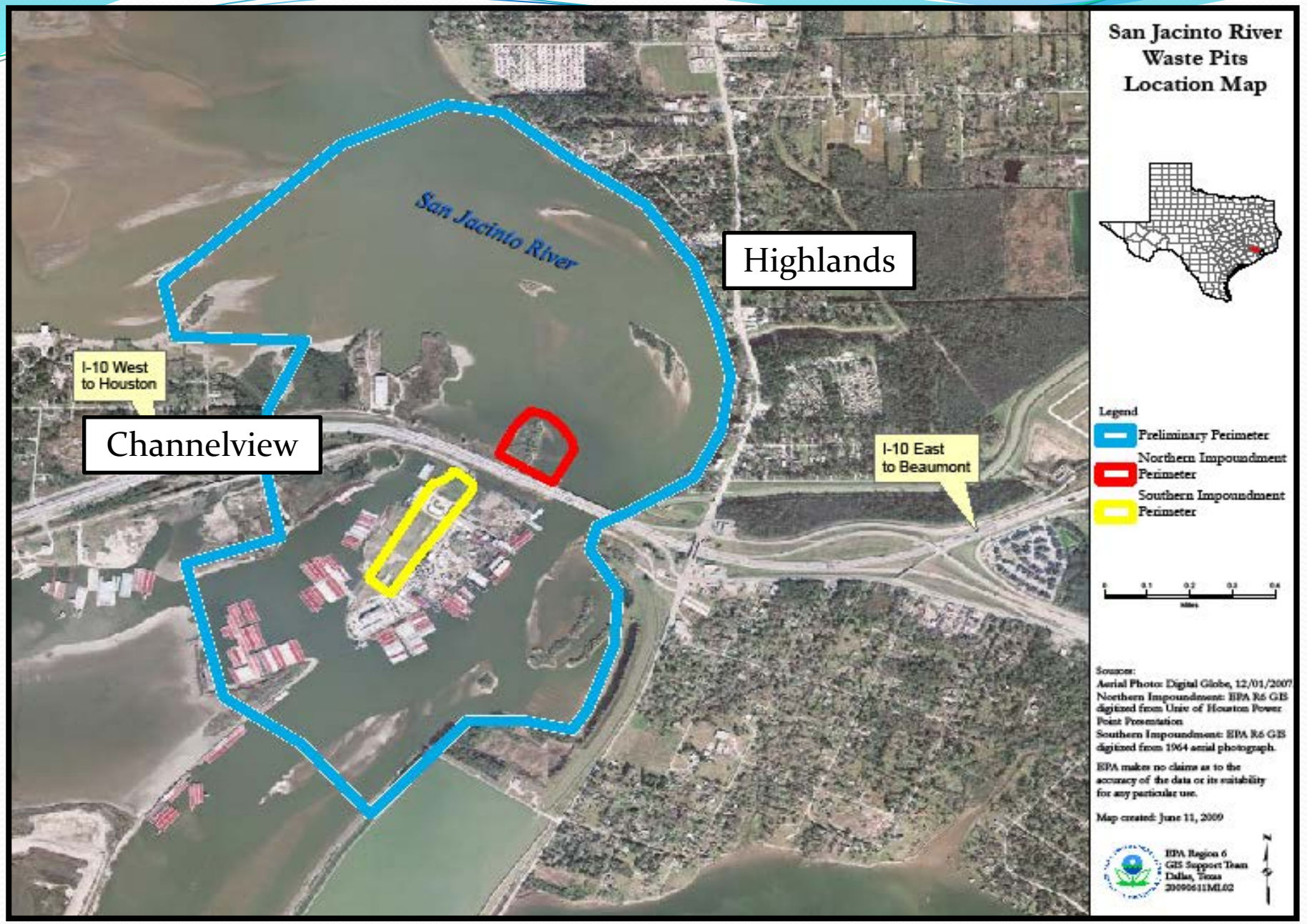
San Jacinto River Waste Pits Superfund Site

9521130

EPA United States Environmental Protection Agency


San Jacinto River
Highlands
I-10 West
to Houston
Channelview
I-10 East
to Beaumont
San Jacinto River
Waste Pits
Location Map
Legend
Preliminary Perimeter
Northern Impoundment
Perimeter
Southern Impoundment
Perimeter
Source:
Aerial Photo: Digital Globe, 12/01/2007
Northern Impoundment: EPA R6 GIS
digitized from Univ of Houston Power
Point Presentation
Southern Impoundment: EPA R6 GIS
digitized from 1964 aerial photograph.
EPA makes no claims as to the
accuracy of the data or its suitability
for any particular use.
Map created: June 11, 2009
EPA Region 6
GIS Support Team
Dallas, Texas
20090611ML02

San Jacinto River Waste Pits

Oct 1964

San Jacinto River Waste Pits

South Impoundment 1965

San Jacinto River Waste Pits

1973


Waste Pits
10
RIVER
JACINTO
SAN
San Jacinto River Waste Pits
Land Use
Land Use
Commercial
Industrial
Residential
Government/Medical/Education
Other
Parks/Open Spaces
Vacant/Developable
Undevelopable
Water
Unknown

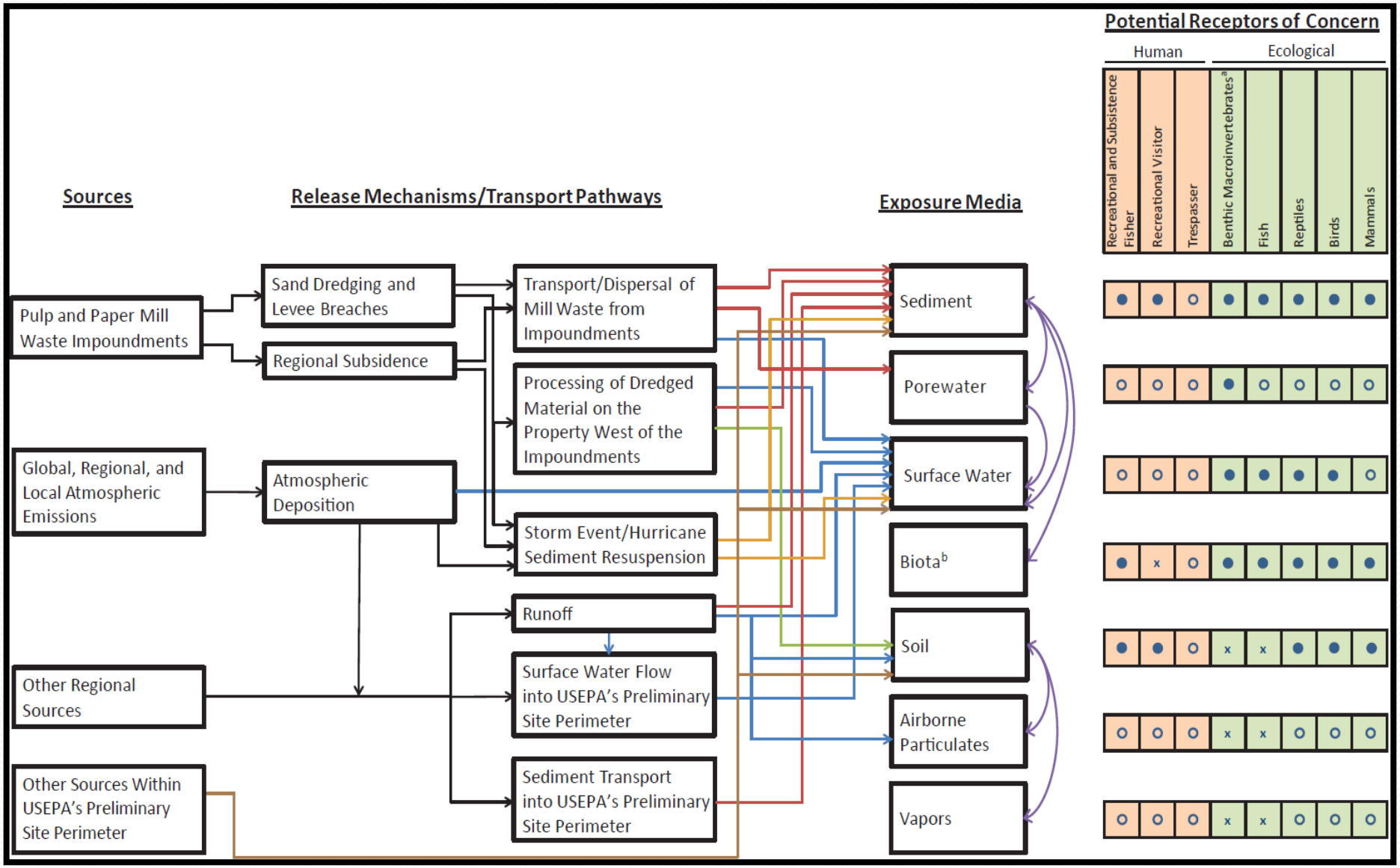
Northern Waste Pits Before Cap

Northern Waste Pits Before Cap

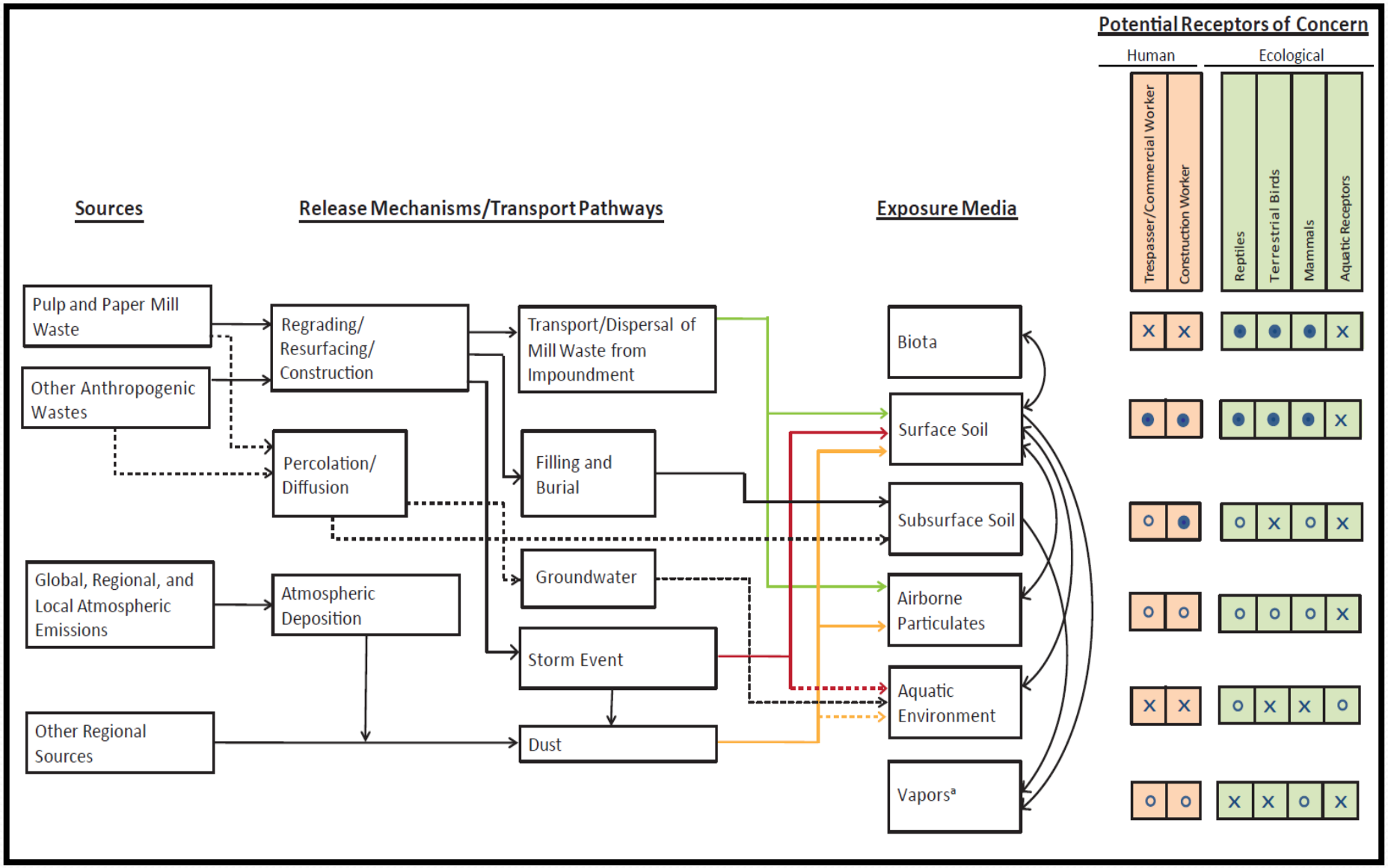
North Waste Pits After Cap

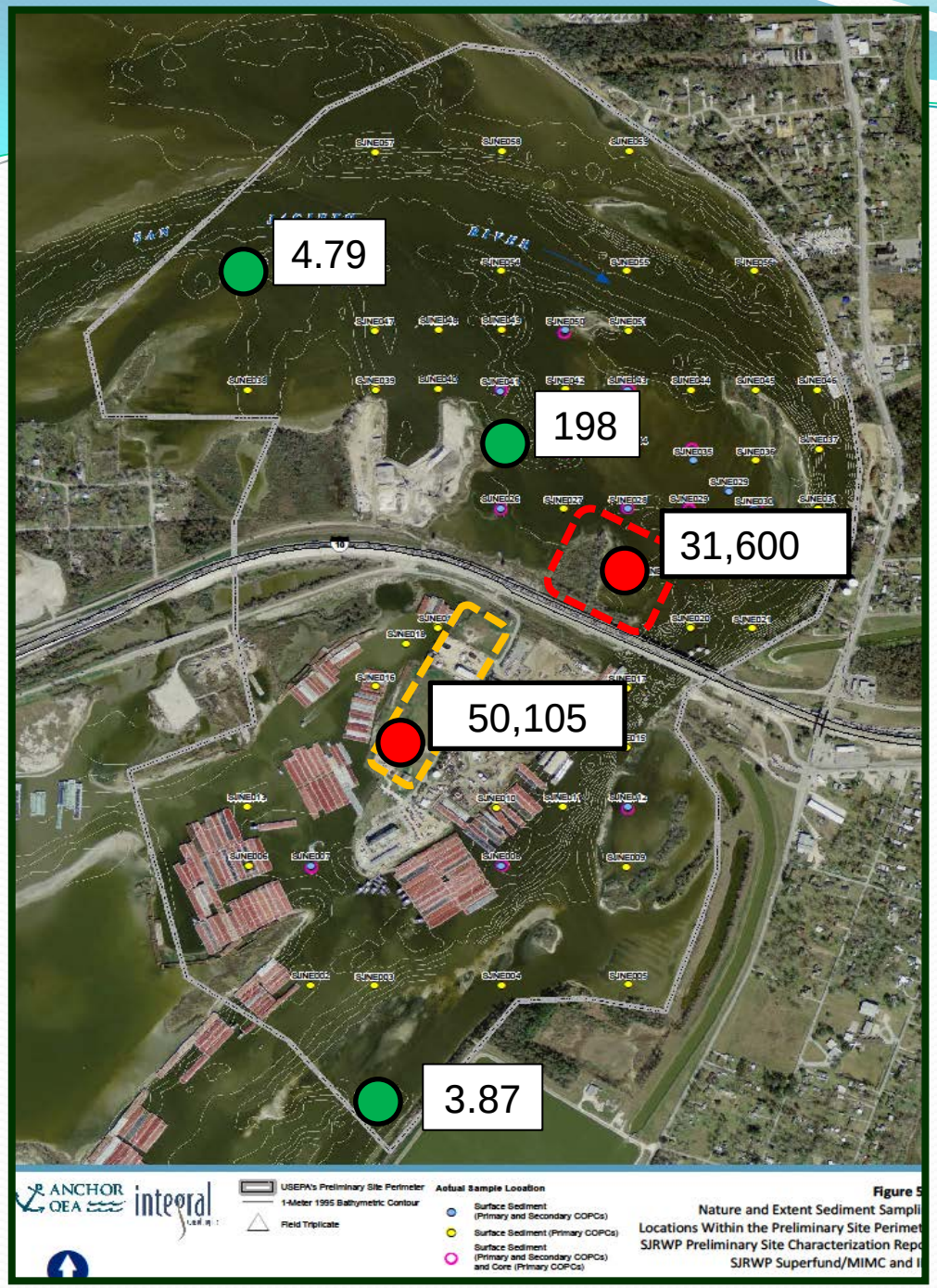
Cap Construction Completed July 12, 2011

San Jacinto River Waste Pits



San Jacinto River Waste Pits





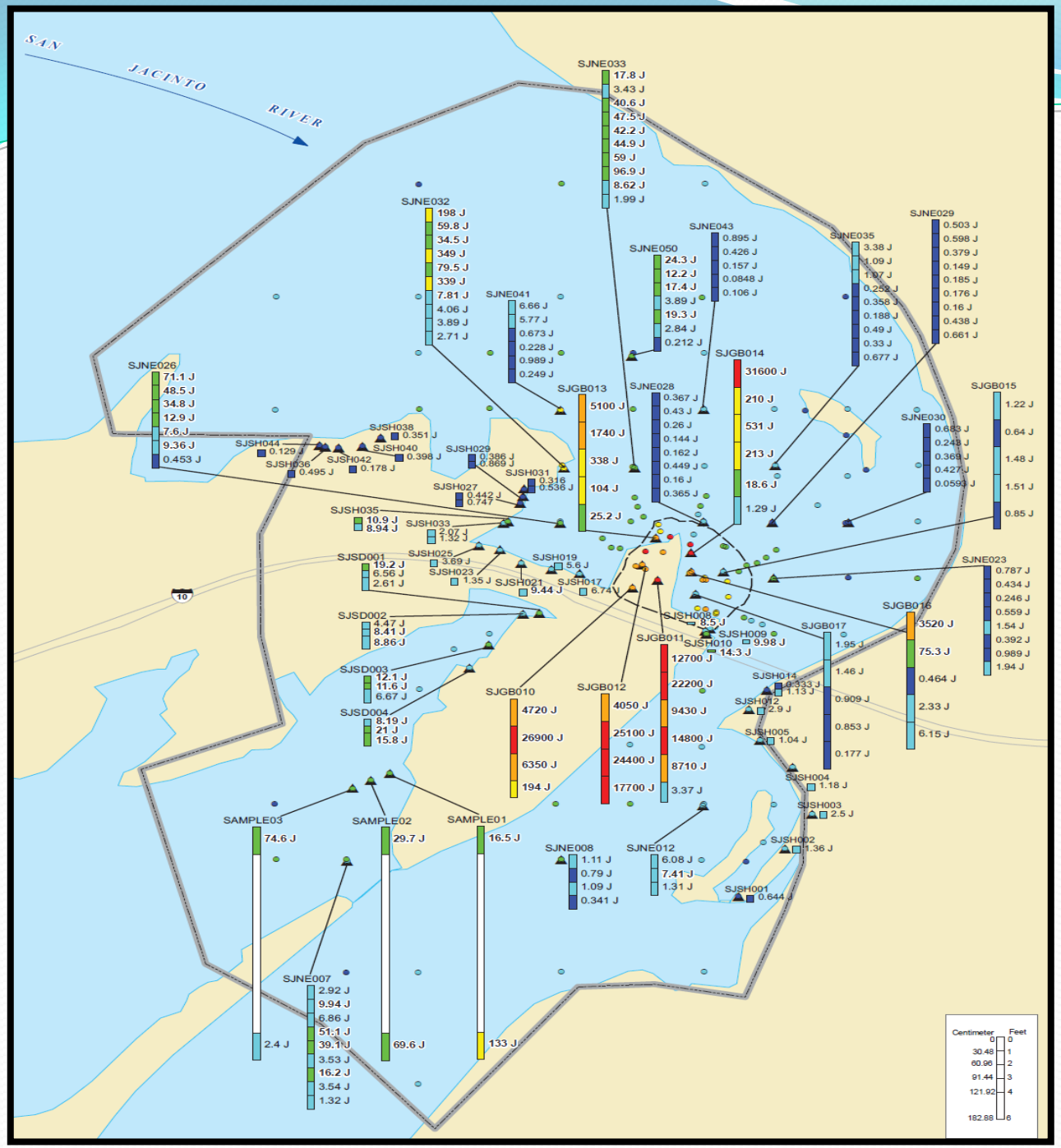
San Jacinto River Waste Pits Site

291 Surface & subsurface sediment samples within preliminary site boundary.

Waste Pits

Southern Impoundment

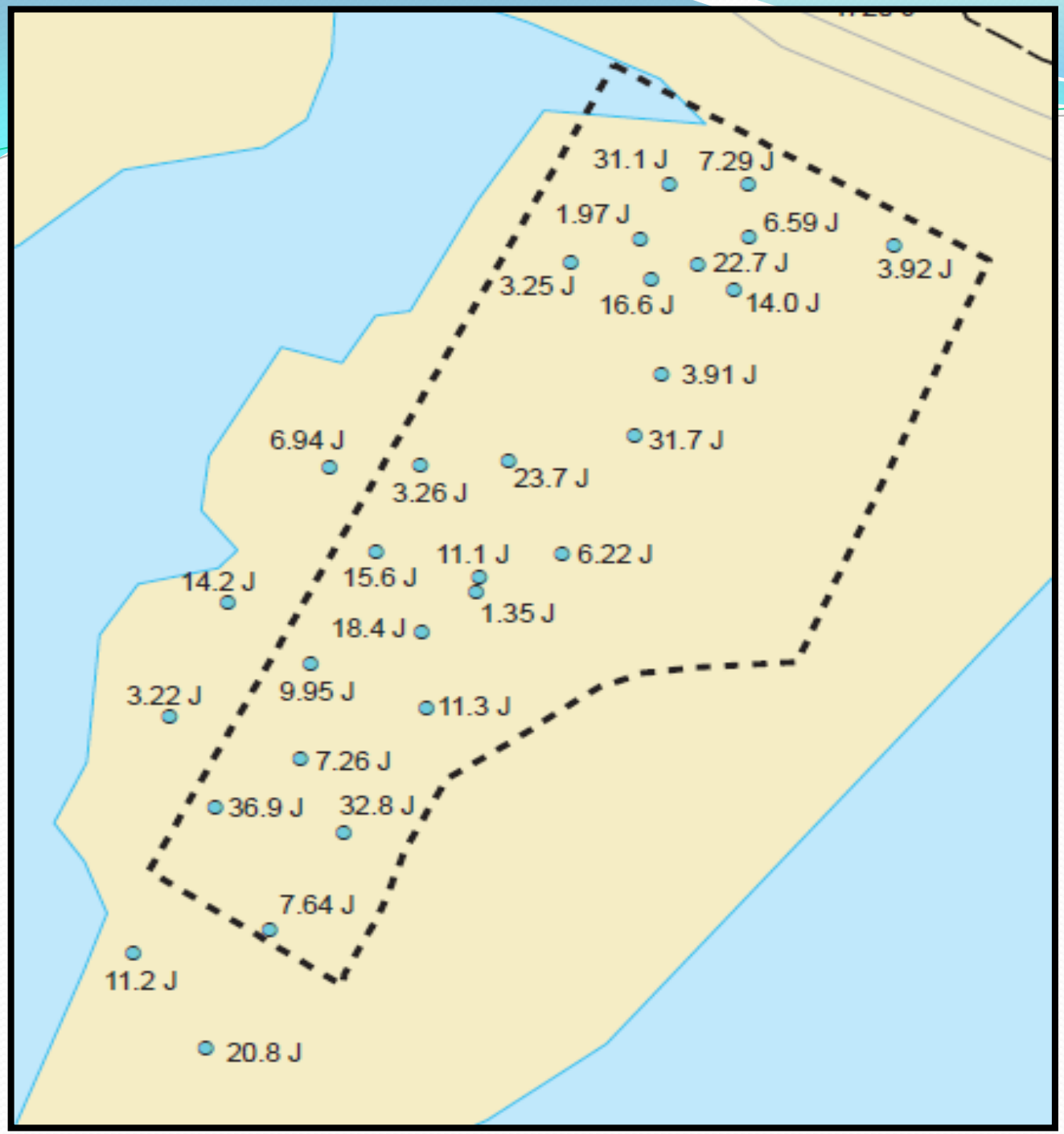
Sediment - ng/kg TEQ_{DF} Dioxin



San Jacinto River Waste Pits

Dioxin/Furan (TEQ) Concentrations in Sediment Cores

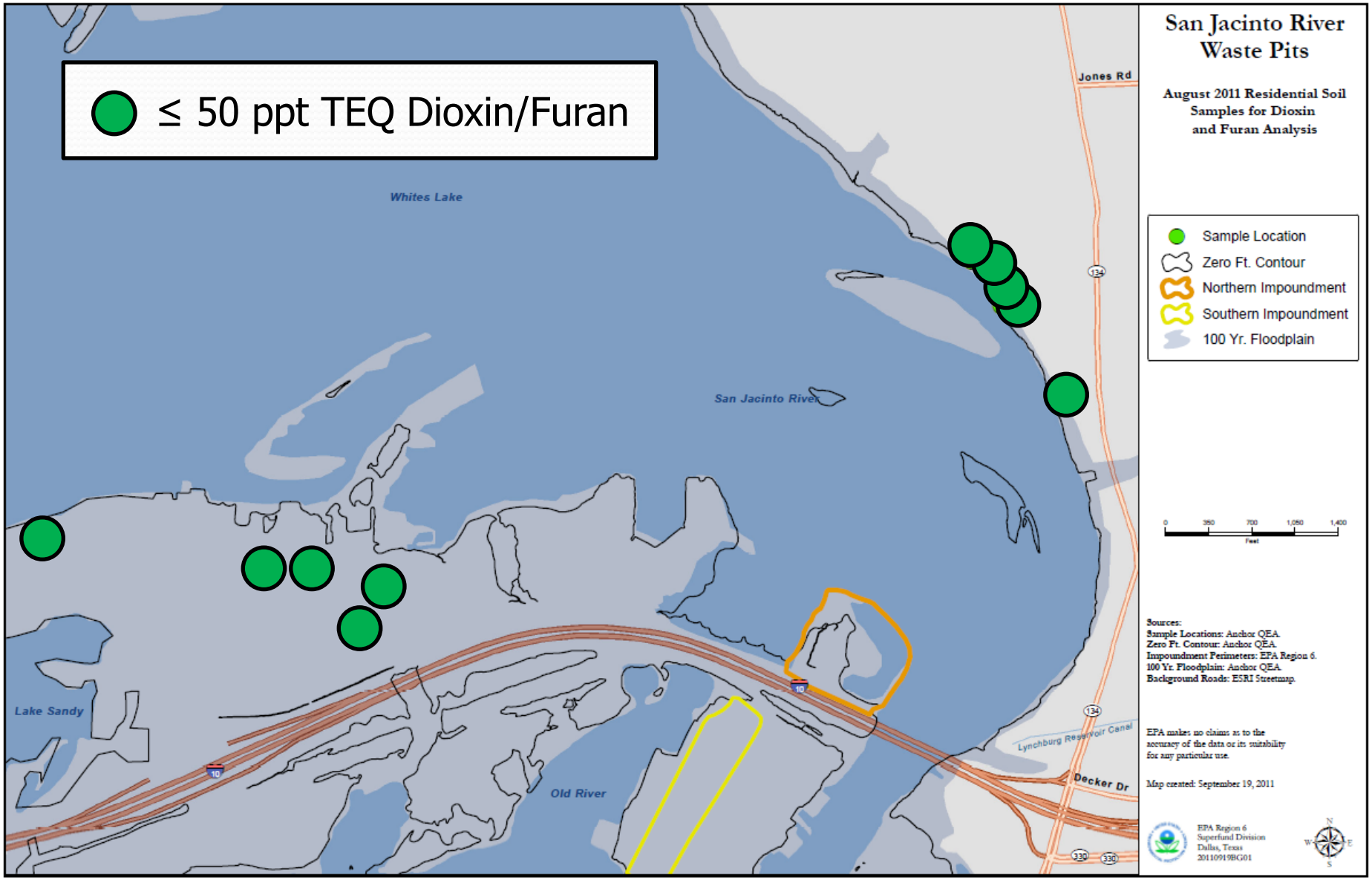
(ng/kg dw)



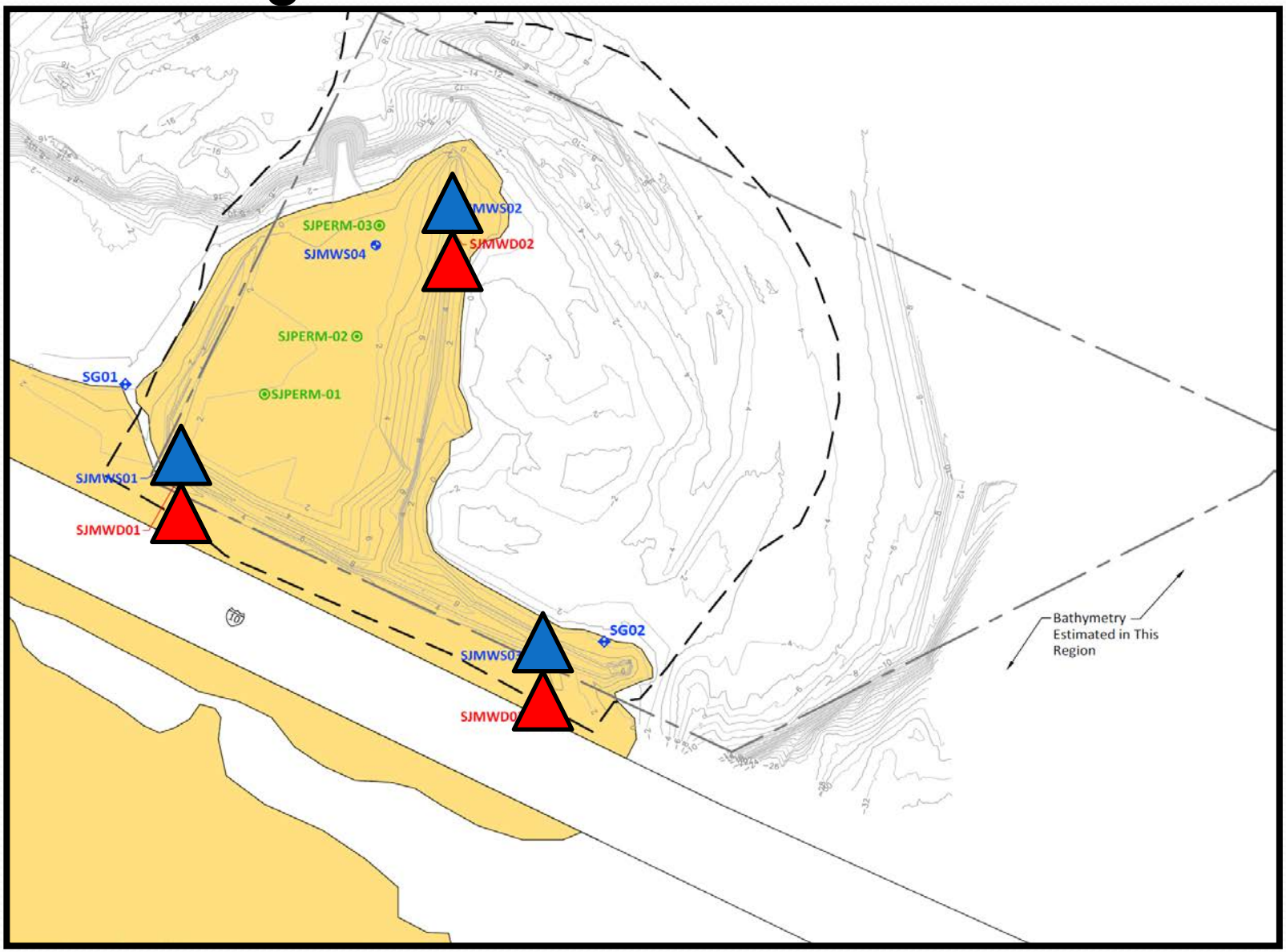
San Jacinto River Waste Pits

Dioxin/Furan (TEQ) Concentrations in Surface Sediment

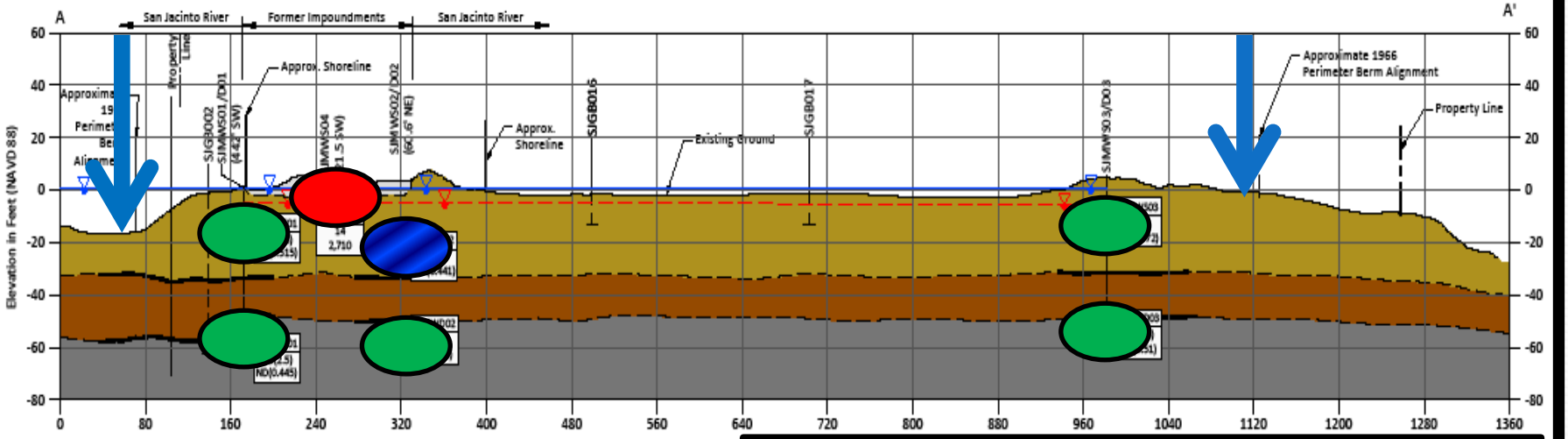
(ng/kg dw)

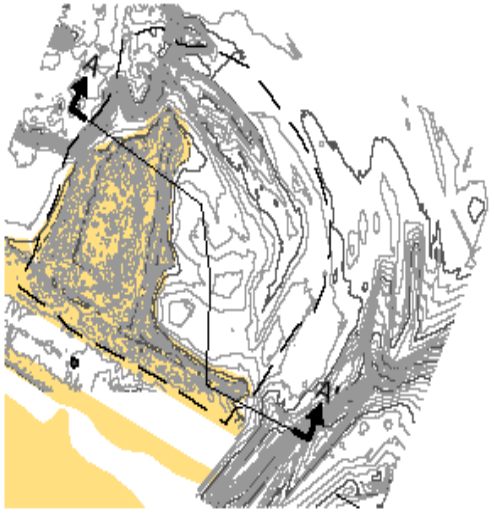

≤ 50 ppt TEQ Dioxin/Furan
Whites Lake
San Jacinto River
Lake Sandy
Old River
Jones Rd
Lynchburg Reservoir Canal
Decker Dr
10
134
330
San Jacinto River Waste Pits
August 2011 Residential Soil Samples for Dioxin and Furan Analysis
Sample Location
Zero Ft. Contour
Northern Impoundment
Southern Impoundment
100 Yr. Floodplain
0 350 700 1,050 1,400
Feet
Sources:
Sample Locations: Anchor QEA.
Zero Ft. Contour: Anchor QEA.
Impoundment Perimeters: EPA Region 6.
100 Yr. Floodplain: Anchor QEA.
Background Roads: ESRI Streetmap.
EPA makes no claims as to the accuracy of the data or its suitability for any particular use.
Map created: September 19, 2011
EPA Region 6
Superfund Division
Dallas, Texas
20110919BG01
N
W
E
S

Northern Waste Pits Groundwater Monitoring Well Locations



Groundwater Cross-Section



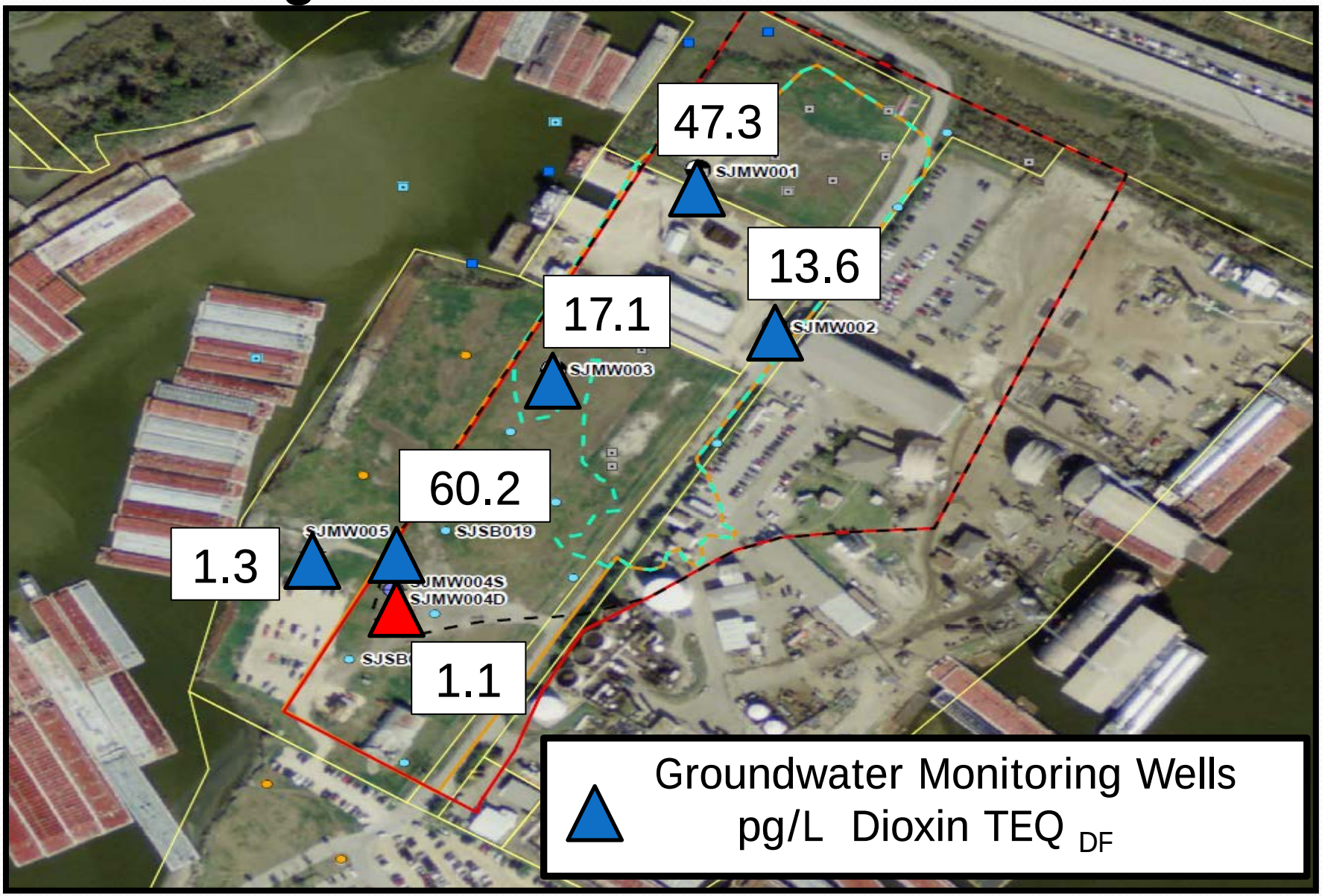


LEGEND:

- Boring location
- Stratigraphic Boundary
- Inferred Stratigraphic Bo
- Approximate Alluvial Pot
- Approximate Chicot Aqui
- Waste (Approximate)
- Interbedded Recent Alluv
- Clay (Brown, Red-Brown-
- SAND (Gray, Blue-Gray) U

- No Dioxin TEQ_{DF} detected in groundwater.
- 3770 pg/L Dioxin TEQ_{DF} in waste material .
- 2.64J pg/L Dioxin TEQ_{DF} in groundwater (MCL 30 pg/L).

Southern Impoundment Groundwater Monitoring Well Locations



San Jacinto River Waste Pits

Sediment Exposure Units –

North Area & Aquatic Environment

San Jacinto River Waste Pits

Non-Cancer Hazard Indices (RME) for Recreational Visitor – North Area

	Incidental Ingestion of Sediment	Incidental Ingestion of Soil	Dermal Contact with Sediment	Dermal Contact with Soil	Total
Hypothetical Recreational Visitor					
Scenario 1 - Direct exposure Beach Area A	1E-03	4E-02	1E-02	8E-03	6E-02
Scenario 2 - Direct exposure Beach Area B/C	9E-03	4E-02	8E-02	8E-03	1E-01
Scenario 3 - Direct exposure Beach Area E	9E+00	4E-02	5E+01	8E-03	6E+01
Scenario 4 - Direct exposure Beach Area D	6E-03	4E-02	6E-02	8E-03	1E-01

Scenario	Noncancer HI			
	Incidental Ingestion of Sediment	Dermal Contact with Sediment	Fish or Shellfish Ingestion	Total
Hypothetical Recreational Fisher				
1A - Direct exposure Beach Area A; Ingestion of catfish from FCA 2/3	8E-04	1E-02	2E+00	2E+00
1B - Direct exposure Beach Area A; Ingestion of clam from FCA 1/3	8E-04	1E-02	3E-02	4E-02
1C - Direct exposure Beach Area A; Ingestion of crab from FCA 2/3	8E-04	1E-02	1E-02	3E-02
2A - Direct exposure Beach Area B/C; Ingestion of catfish from FCA 2/3	7E-03	6E-02	2E+00	2E+00
2B - Direct exposure Beach Area B/C; Ingestion of clam from FCA 2	7E-03	6E-02	2E-01	3E-01
2C - Direct exposure Beach Area B/C; Ingestion of crab from FCA 2/3	7E-03	6E-02	1E-02	8E-02
3A - Direct exposure Beach Area E; Ingestion of catfish from FCA 2/3	7E+00	4E+01	2E+00	5E+01
3B - Direct exposure Beach Area E; Ingestion of clam from FCA 2	7E+00	4E+01	2E-01	4E+01
3C - Direct exposure Beach Area E; Ingestion of crab from FCA 2/3	7E+00	4E+01	1E-02	4E+01
4A - Direct exposure Beach Area D; Ingestion of catfish from FCA 1	5E-03	5E-02	2E+00	2E+00
4B - Direct exposure Beach Area D; Ingestion of clam from FCA 1/3	5E-03	5E-02	3E-02	8E-02
4C - Direct exposure Beach Area D; Ingestion of crab from FCA 1	5E-03	5E-02	2E-02	8E-02
Hypothetical Subsistence Fisher				
1A - Direct exposure Beach Area A; Ingestion of catfish from FCA 2/3	2E-03	3E-02	2E+01	2E+01
1B - Direct exposure Beach Area A; Ingestion of clam from FCA 1/3	2E-03	3E-02	4E-01	5E-01
1C - Direct exposure Beach Area A; Ingestion of crab from FCA 2/3	2E-03	3E-02	2E-01	2E-01
2A - Direct exposure Beach Area B/C; Ingestion of catfish from FCA 2/3	2E-02	2E-01	2E+01	2E+01
2B - Direct exposure Beach Area B/C; Ingestion of clam from FCA 2	2E-02	2E-01	3E+00	3E+00
2C - Direct exposure Beach Area B/C; Ingestion of crab from FCA 2/3	2E-02	2E-01	2E-01	4E-01
3A - Direct exposure Beach Area E; Ingestion of catfish from FCA 2/3	2E+01	1E+02	2E+01	1E+02
3B - Direct exposure Beach Area E; Ingestion of clam from FCA 2	2E+01	1E+02	3E+00	1E+02
3C - Direct exposure Beach Area E; Ingestion of crab from FCA 2/3	2E+01	1E+02	2E-01	1E+02
4A - Direct exposure Beach Area D; Ingestion of catfish from FCA 1	1E-02	1E-01	2E+01	2E+01
4B - Direct exposure Beach Area D; Ingestion of clam from FCA 1/3	1E-02	1E-01	4E-01	6E-01
4C - Direct exposure Beach Area D; Ingestion of crab from FCA 1	1E-02	1E-01	3E-01	5E-01

San Jacinto River Waste Pits

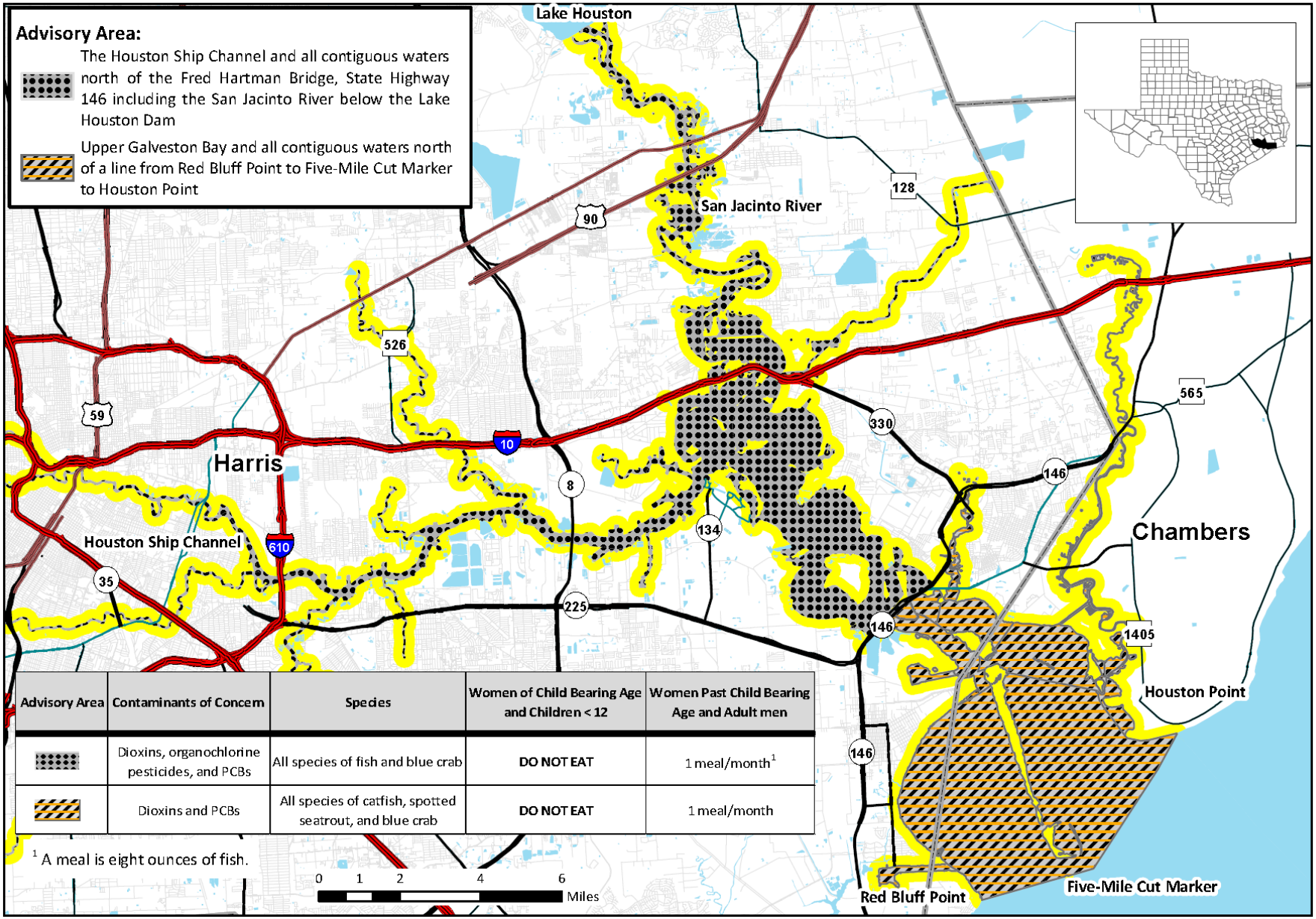
Non-Cancer Hazard Indices for Construction Worker – South Area

Scenario	RME	CTE
Scenario DS-1 - Direct exposure to soils		
Reproductive/Developmental (TEQ_{DF})	5E+00	--
Skin /Dermal (inorganic arsenic)	3E-02	--
Immunotoxicity (PCBs)	2E-02	--
Total	5E+00	--
Scenario DS-2 - Direct exposure to soils		
Reproductive/Developmental (TEQ_{DF})	2E+01	4E+00
Skin /Dermal (inorganic arsenic)	3E-02	6E-03
Immunotoxicity (PCBs)	3E-02	7E-03
Total	2E+01	4E+00
Scenario DS-4 - Direct exposure to soils		
Reproductive/Developmental (TEQ_{DF})	2E+01	3E+00
Skin /Dermal (inorganic arsenic)	1E-01	3E-02
Immunotoxicity (PCBs)	4E-02	9E-03
Total	2E+01	3E+00

Galveston Bay Estuary (Map 1) – Houston Ship Channel, San Jacinto River, and Upper Galveston Bay

Chambers and Harris Counties

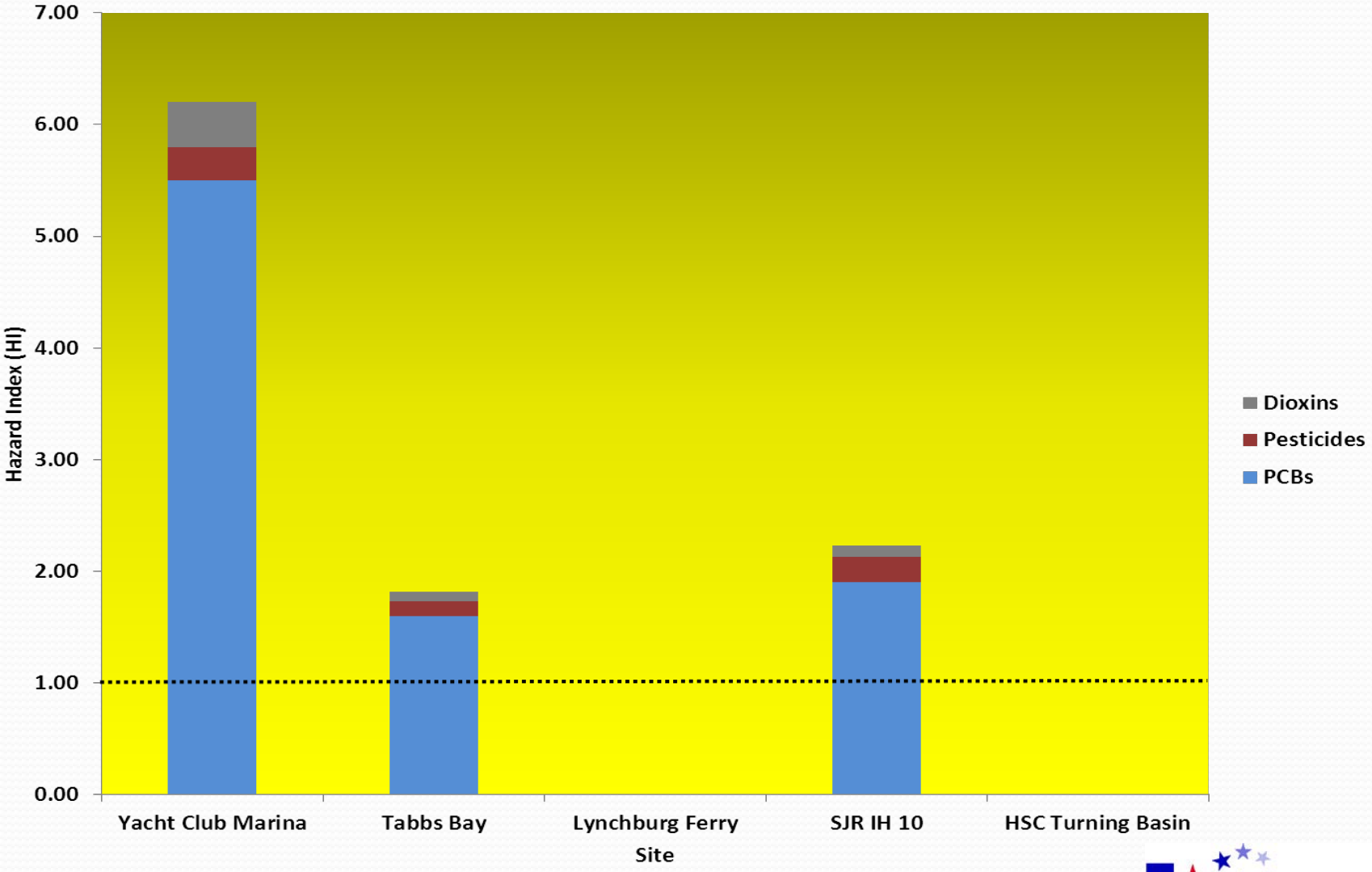
ADV-49 and ADV-50 Issued June 26, 2013 Rescinding ADV-3, ADV-20, and ADV-35



Advisory Area	Contaminants of Concern	Species	Women of Child Bearing Age and Children < 12	Women Past Child Bearing Age and Adult men
	Dioxins, organochlorine pesticides, and PCBs	All species of fish and blue crab	DO NOT EAT	1 meal/month[1]
	Dioxins and PCBs	All species of catfish, spotted seatrout, and blue crab	DO NOT EAT	1 meal/month

[1] A meal is eight ounces of fish.

Spotted Seatrout Hazard Index by Site



TEXAS Department of State Health Services

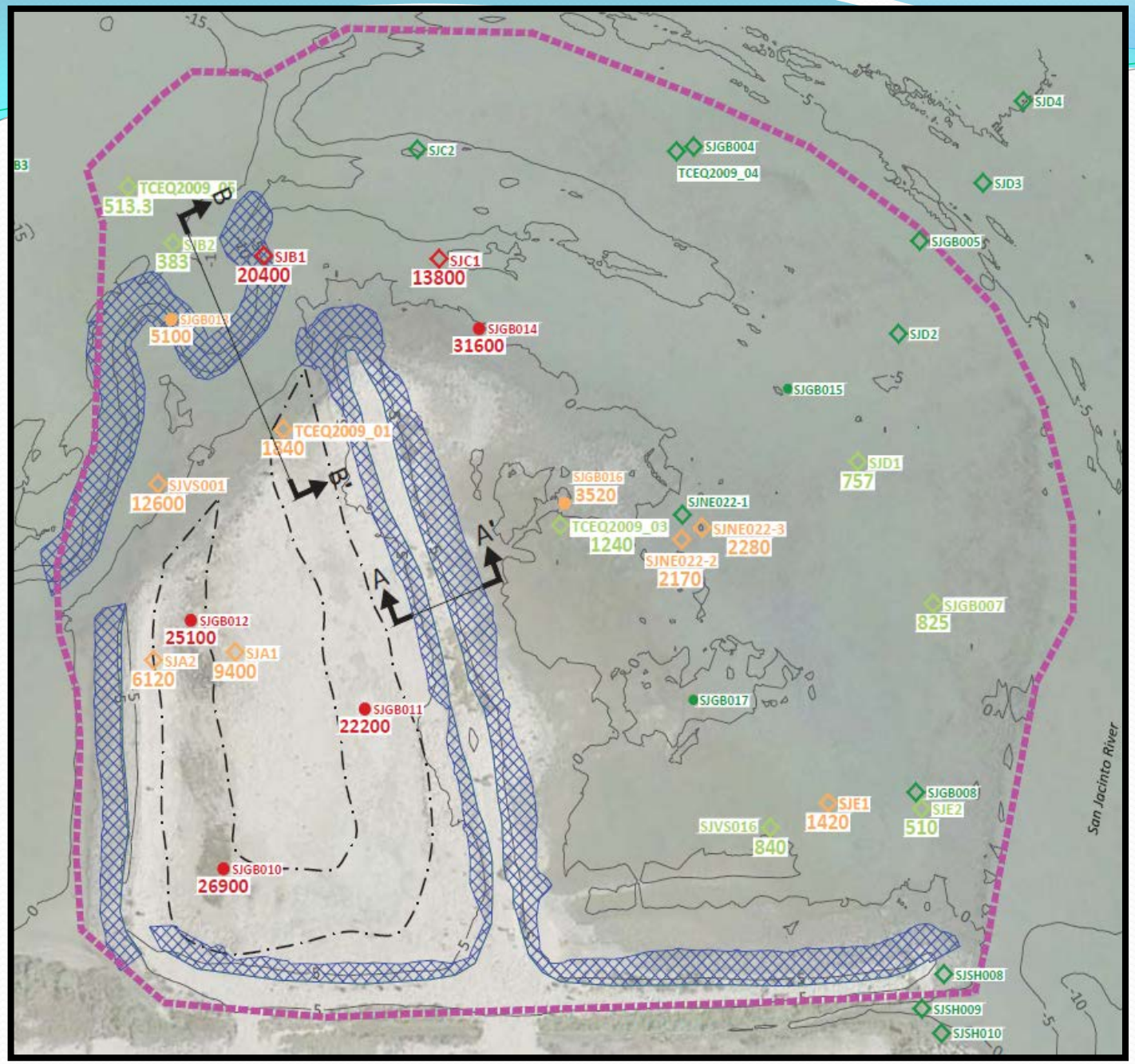
San Jacinto River

- 1994 flood had peak discharge of 360,000 cfs (greater than 100-years return period).
- River reached 27-feet above sea level.
- **10 to 12-feet of bed scour** just south of the I-10 bridge.
- Caused major soil erosion in flood plain and river channel.
- Created channels outside the San Jacinto River bed.
- River cut new channel through Banana Bend: **510-feet wide & 15-feet** deep.

San Jacinto River Waste Pits

Northern Area Remediation Alternatives :

- Alt. 1N: TCRA Cap (No further action).
  Cost: $520,000.
- Alt. 2N: TCRA Cap, ICs & MNR.
  Cost: $1.3 million.
- Alt. 3N: Permanent Cap (cap enhancements), ICs, & MNR.
  Cost: $3.5 million; 2 months construction.
- Alt. 4N: Partial Solidification, Permanent Cap, ICs, & MNR.
  Cost: $14.2 million; 17 months construction.
- Alt. 5N: Partial Removal, Permanent Cap, ICs, & MNR.
  Cost: $29.1 million; 13 months construction.
- Alt. 5aN: Partial removal, Permanent Cap, ICs, & MNR.
  Cost: $68.9 million; 19 months construction.
- Alt. 6N: Full removal (greater than 220 ng/kg).
  Cost: $90.2 million; 16 months construction.

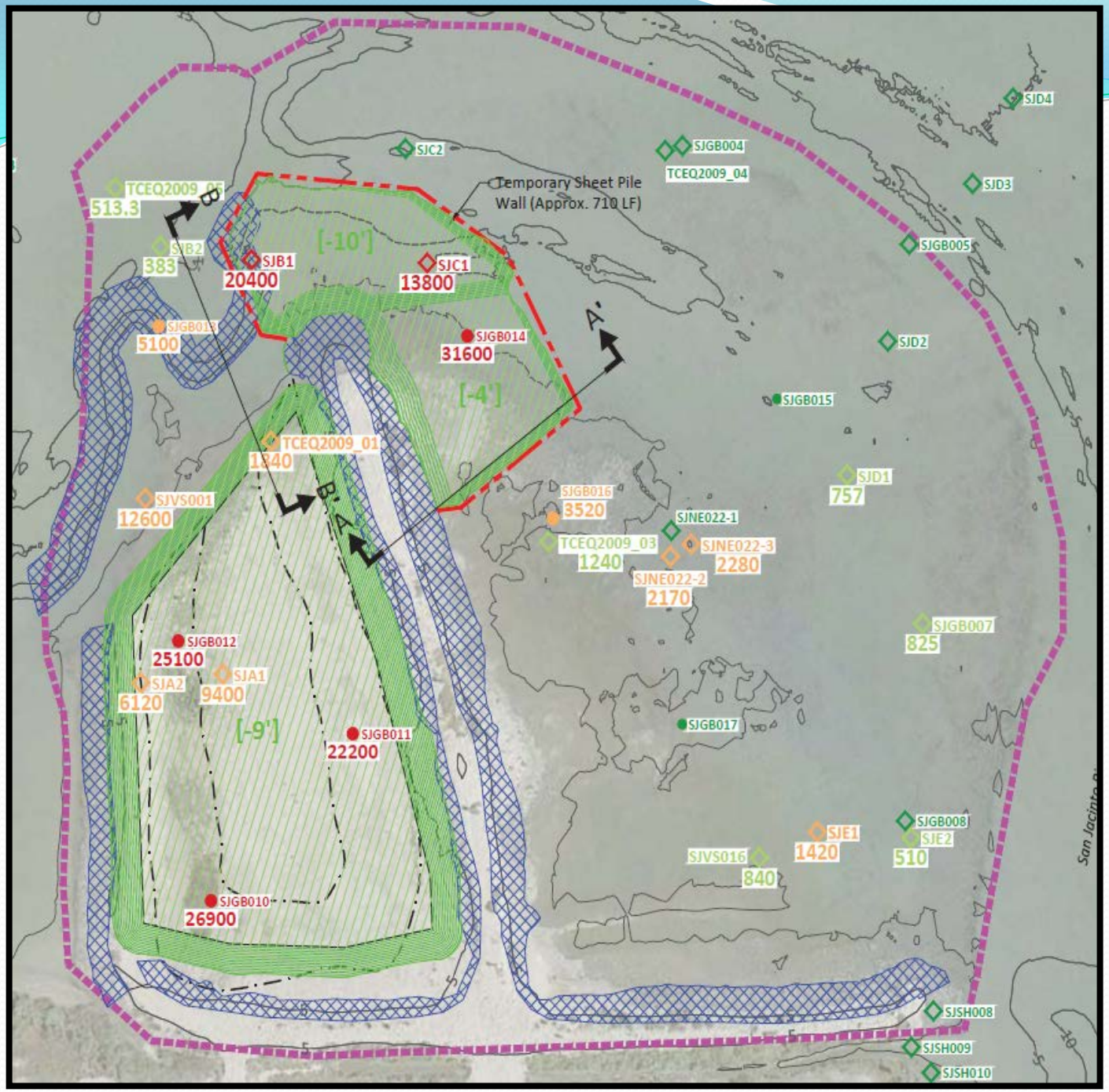


San Jacinto River Waste Pits

Alternative 3N

Cap Enhancements:

- 2 mo. Construction
- $3.5 MM

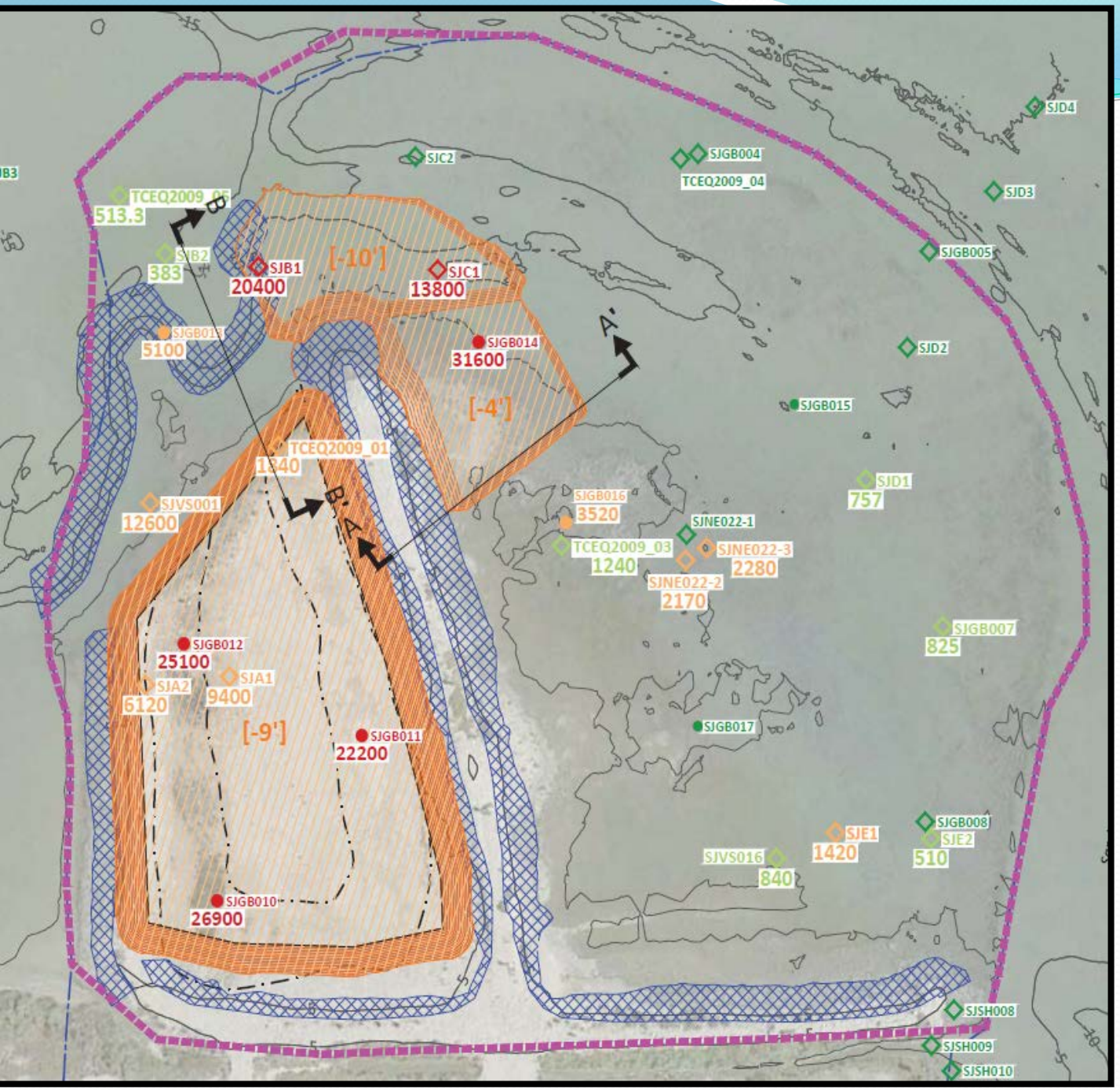


San Jacinto River Waste Pits

Alternative 4N

Partial Solidification (52,000 CY-29%):

- 17 mo. Construction
- $ 14.2 MM

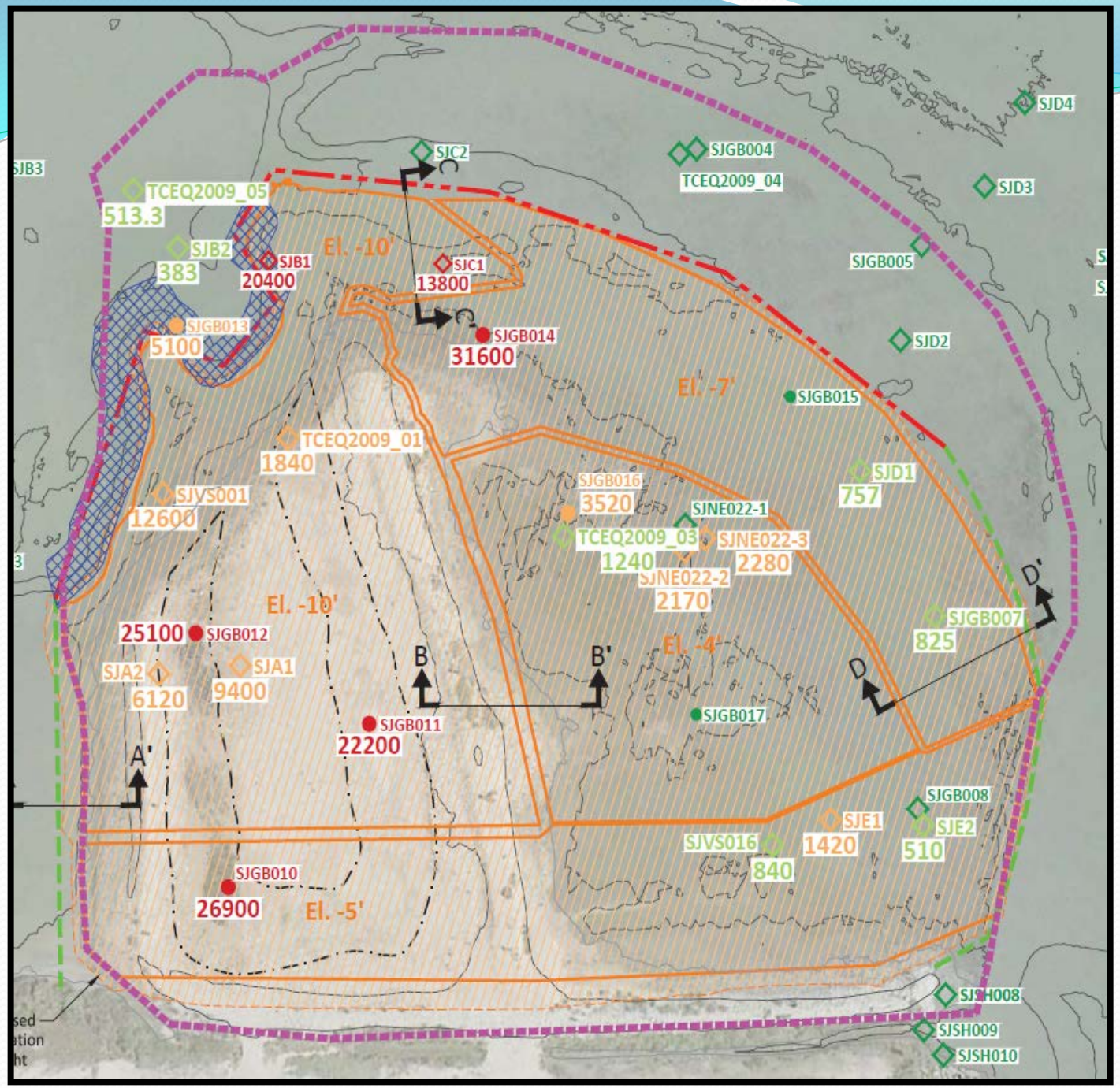


San Jacinto River Waste Pits

Alternative 5N

Partial Removal: (52,000 CY-29%)

- 13 mo. Construction
- $29.1 MM



San Jacinto River Waste Pits

Alternative 5aN

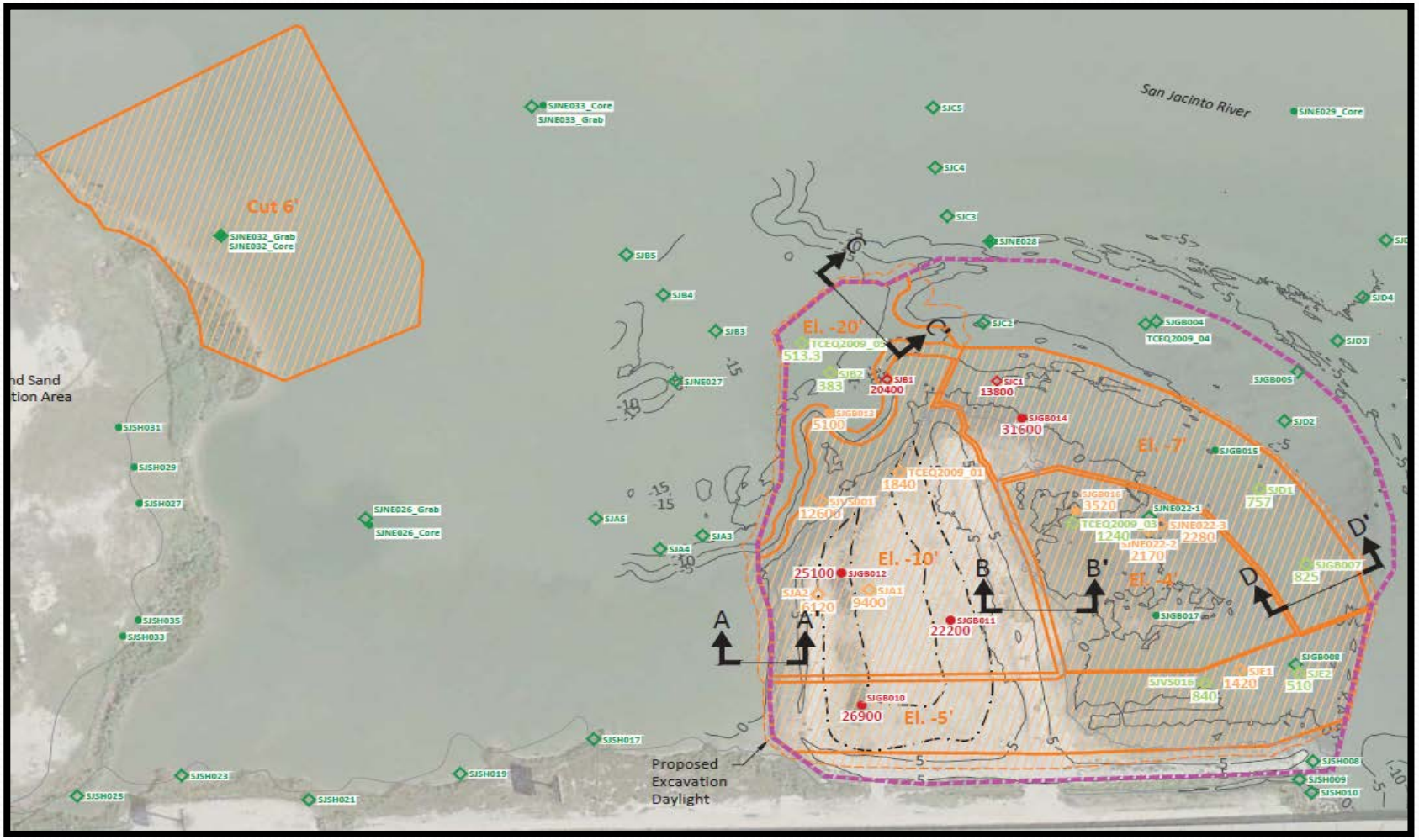
Partial Removal (137,000 CY–76%):

- 19 mo. Construction
- $68.9 MM

San Jacinto River Waste Pits

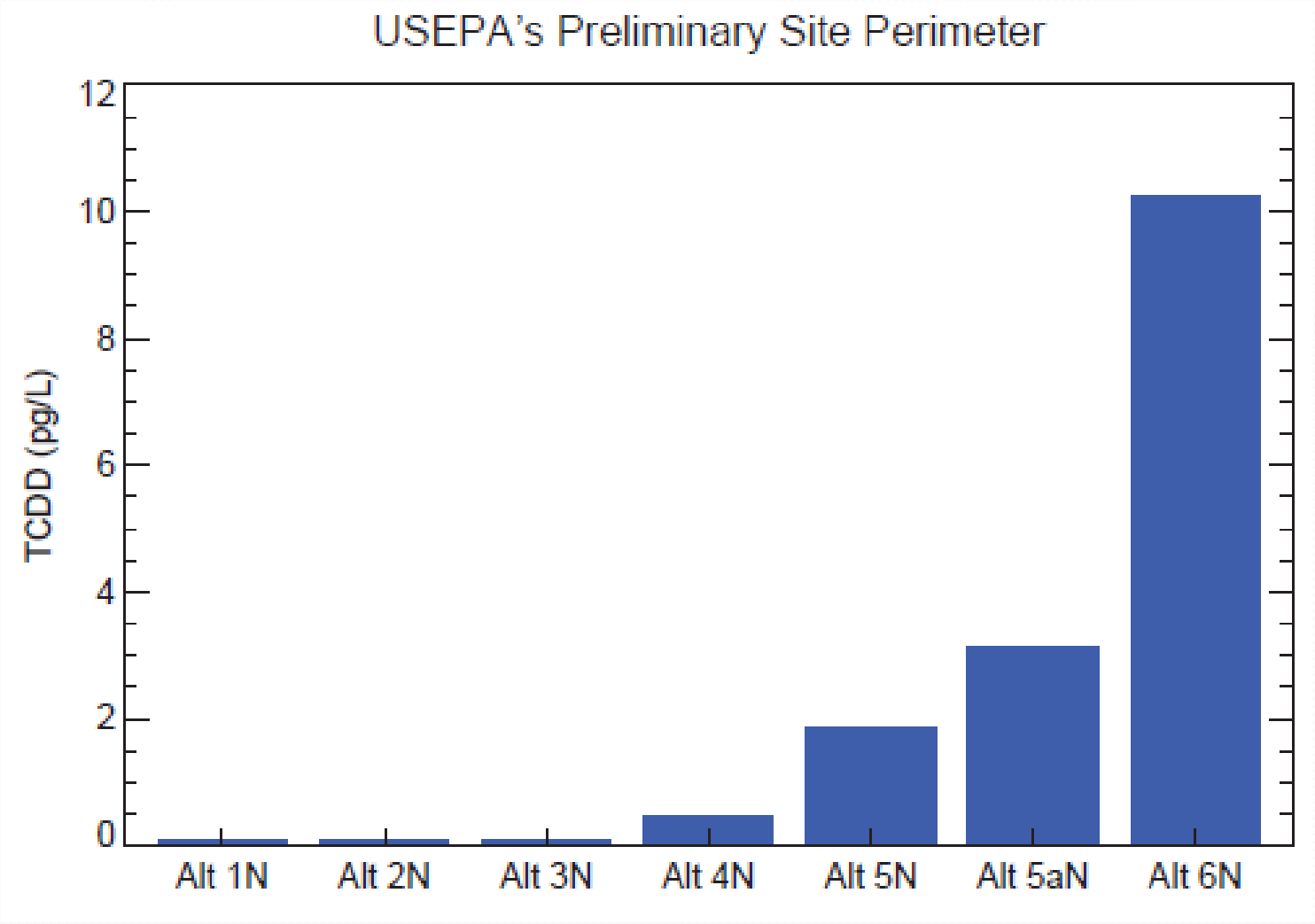
Alternative 6N (200,100 CY)

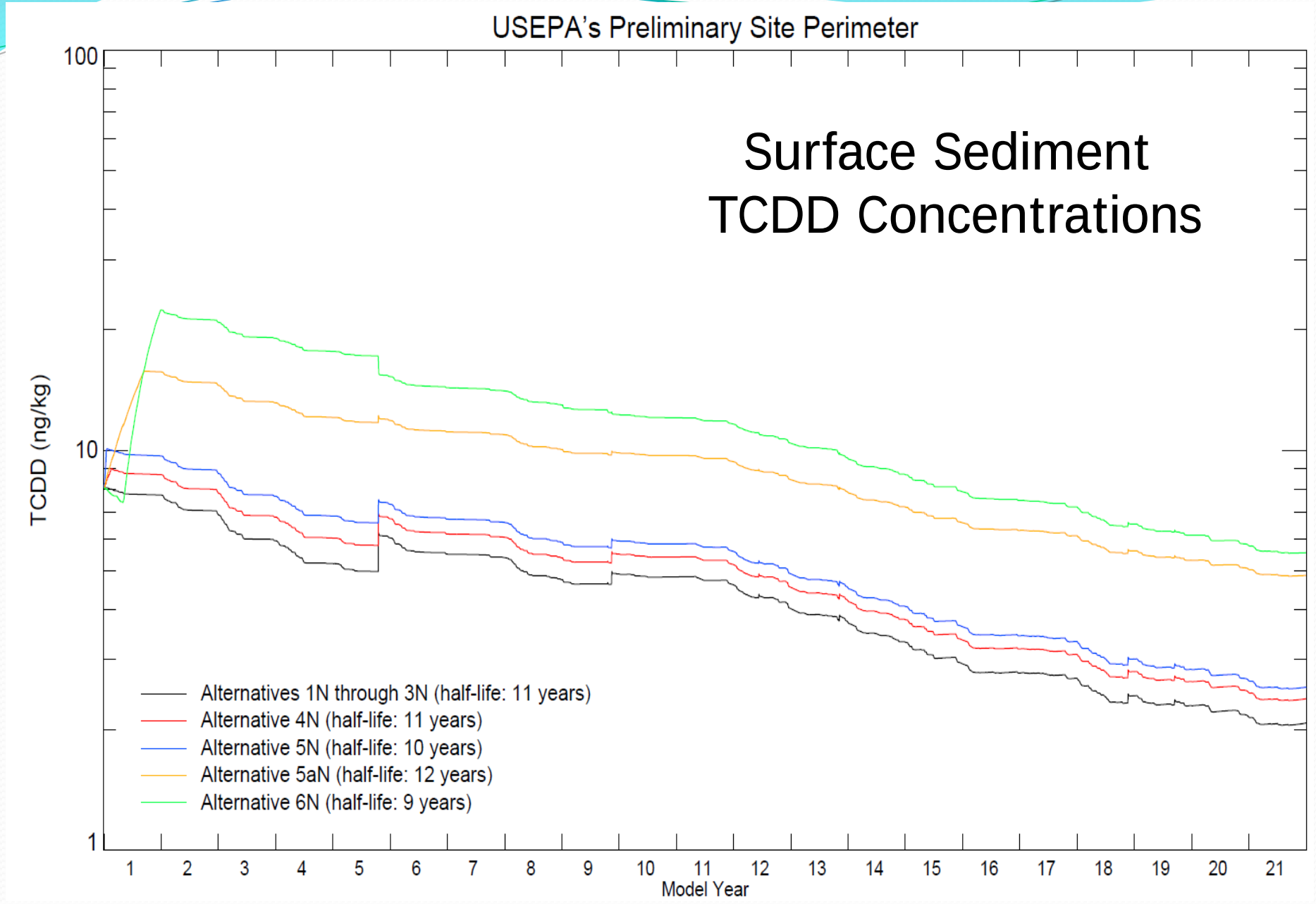
Full Removal: 16 mo. construction; $ 90.2 MM

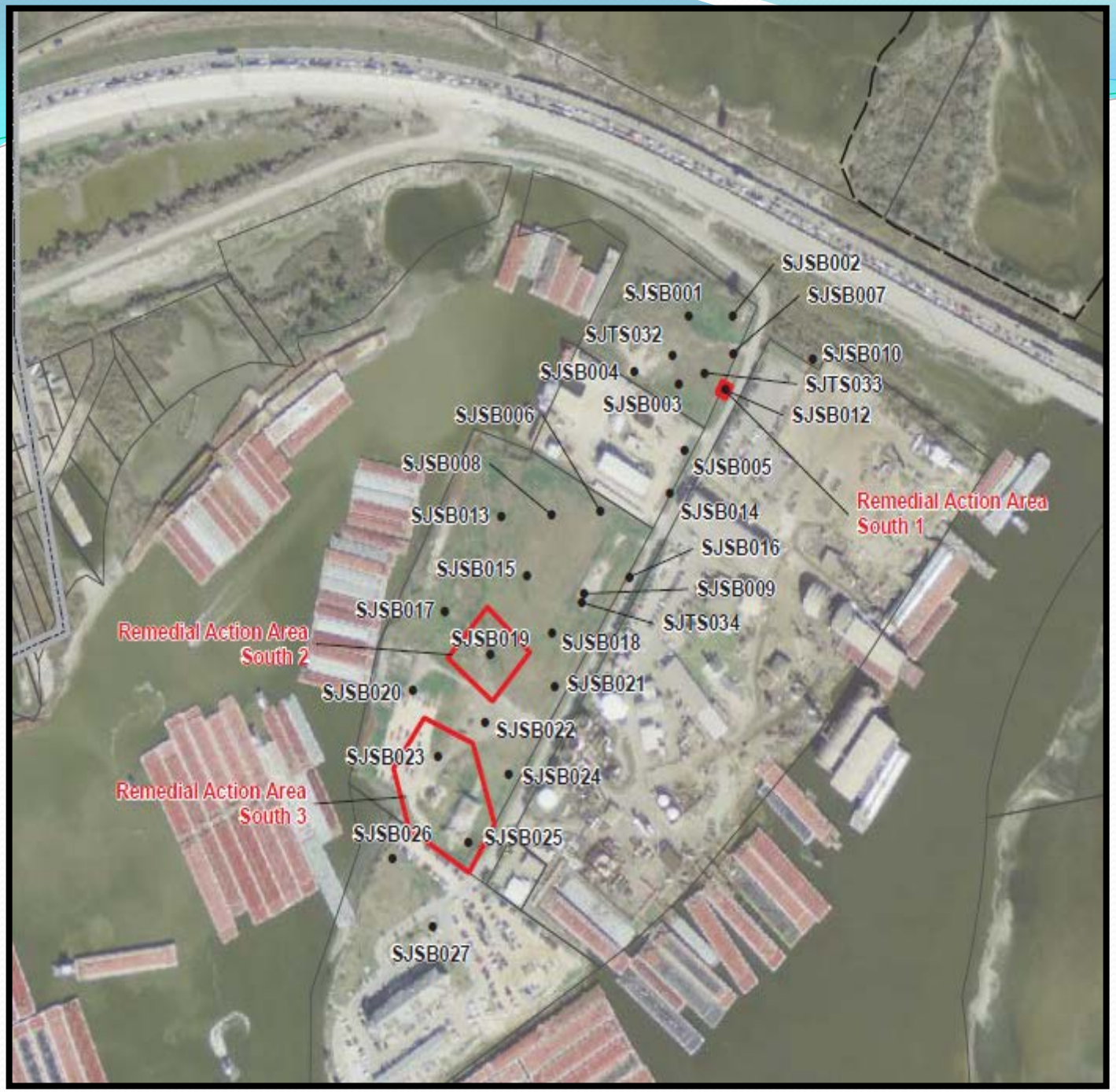


San Jacinto River Waste Pits

Year 1 – Model Predicted Water Concentration




USEPA's Preliminary Site Perimeter
Surface Sediment
TCDD Concentrations
TCDD (ng/kg)
100
10
1
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
Model Year
Alternatives 1N through 3N (half-life: 11 years)
Alternative 4N (half-life: 11 years)
Alternative 5N (half-life: 10 years)
Alternative 5aN (half-life: 12 years)
Alternative 6N (half-life: 9 years)



San Jacinto River Waste Pits

Preliminary Remedial Action Areas South of I-10

San Jacinto River Waste Pits

Southern Area Remediation Alternatives :

- Alt. 1S: No action.
  Cost: $143,000.
- Alt. 2S: Institutional Controls.
  Cost: $273,000.
- Alt. 3S: Enhanced Institutional Controls.
  Cost: $663,000; 1 month construction.
- Alt. 4S: Removal & Off-Site Disposal
  (from 2 to 10-feet; 32,000 CY).
  Cost: $9.9 million; 7 months construction.

San Jacinto River Waste Pits

Pros/Cons of Several Alternatives:

- **Alt. 3N:**
  - Quickest construction (2 mo.).
  - Least storm exposure during construction (cap not removed).
  - Minimal sediment re-suspension.
  - Cap: 500-year storm event design with 5-foot high rock berm outside perimeter.
  - Lower cost ($3.5 million)

  But;
  - No waste removal; no treatment/removal of Principal Threat waste.
  - Long term exposure to storm scour/undercut damage.
  - Higher long-term maintenance costs.
- **Alt. 5aN:**
  - Removes waste material with highest contamination.
  - Uses sheetpiles/earthen berm during waste removal to reduce re-suspension.

  But;
  - Longer construction (19 mo.) with exposure to storms (cap partially removed).
  - Sediment re-suspension during dredging.
  - Increased fish tissue dioxin, at least initially.
  - Higher cost ($68.9 million).

San Jacinto River Waste Pits

Recommended Remedy: Alternative 5aN:

- Permanently removes waste material with highest contamination.
- Uses sheetpiles and earthen berm during waste removal to reduce re-suspension, in addition to BMPs.
- Contains/protects remaining lower level material with armor cap.
- Improved long-term effectiveness compared to Alt. 1N through 5N.
- Improved short-term effectiveness compared to Alt. 6N because it has less re-suspension & less impact on fish.
- More cost effective than Alt. 6N because it addresses most of risk for $20 MM less cost.

San Jacinto River Waste Pits

Recommended Remedy: Alternative 4S (Removal/Institutional Controls):

- Permanently removes waste material from Southern Impoundment Area.
- Uses institutional controls to provide protection for areas under buildings.
- Provides long-term protection from storm erosion/scour.

San Jacinto River Waste Pits

Texas Department of State Health Services:

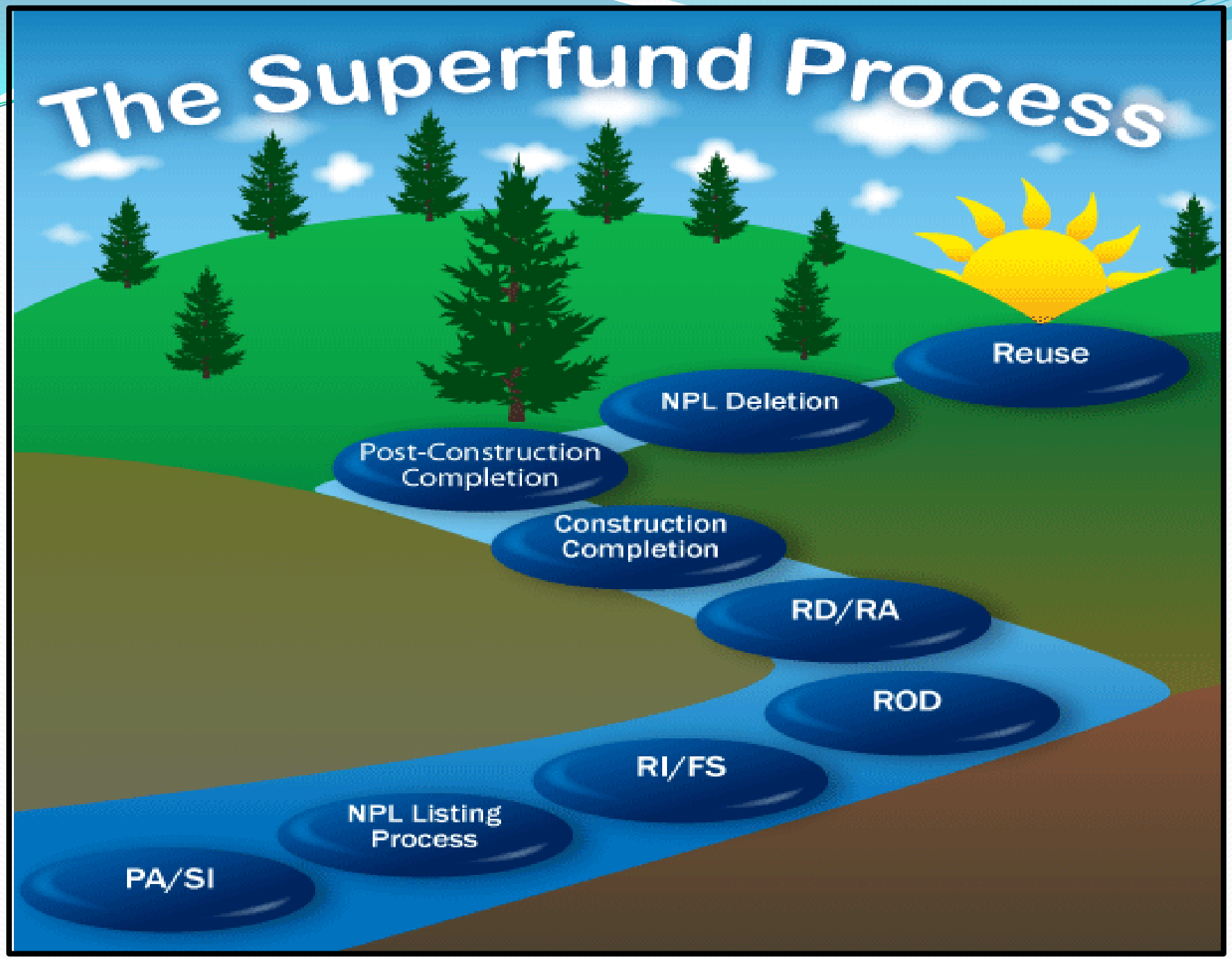
- Conducting investigation of cancer & birth defects frequency in the area.
- Will compare results to expected frequencies.
- TDSHS performed door-to-door visits in Channelview to discuss health concerns with community in January 2014.

Schedule
San Jacinto River Waste Pits Superfund Site

- **NRRB**
- June 2014

- **Proposed Plan/Public Comment Period**
- September 2014

- **Remedy Selection (ROD)**
- December 2014


The Superfund Process
Reuse
NPL Deletion
Post-Construction Completion
Construction Completion
RD/RA
ROD
RI/FS
NPL Listing Process
PA/SI

TCRA Update – Western Berm Erosion

- Berm erosion July 2012.
- Completion of repairs August 2012.

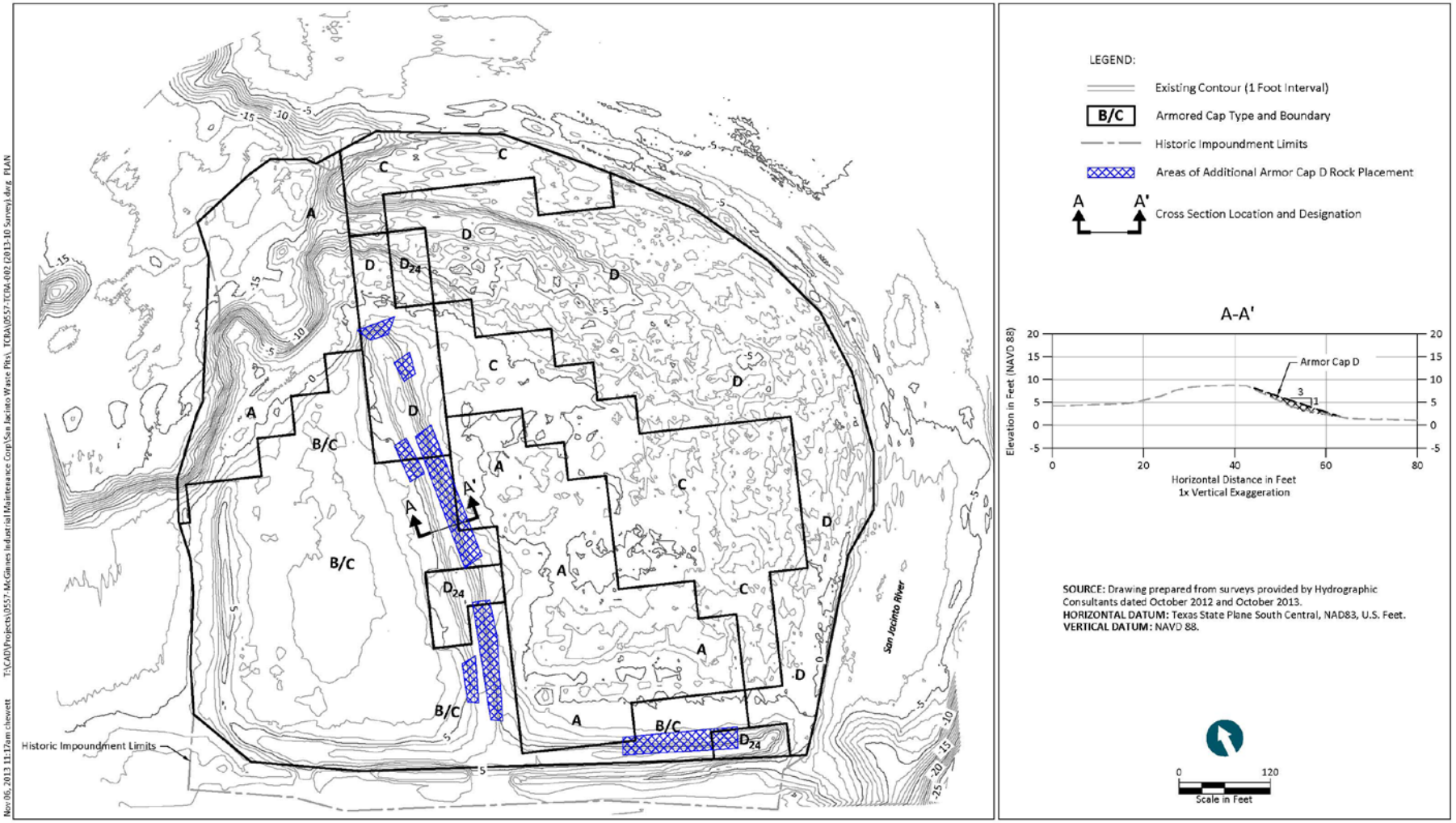


Fig. 1 – Armor Cap Enhancement Work Plan - Armor cap D placement areas with improved slope construction

Constructing enhanced slope along the South Berm in the Eastern Cell using an excavator (for grading the rock) and skid steer (for transporting rock from the stockpile and placing it)– 1-21-2014

San Jacinto River Waste Pits Superfund Site
For More Information

U.S. EPA

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Remedial Project Manager
214.665.8318 or 1.800.533.3508 (toll-free)

Valmichael Leos
On-Scene Coordinator
214.665.2283 or 1.800.533.3508 (toll-free)

Donn Walters
Sr. Community Involvement Coordinator / Public Liaison
214.665.6483 or 1.800.533.3508 (toll-free)

Texas Commission on Environmental Quality

Stephen Ellis
Project Manager, Superfund Section
512.239.5337

Crystal Taylor
Community Relations, Superfund Section
512.239.3844

Site Repository
Highlands Public Library, Stratford Branch
509 Stratford Street, Highlands Texas

San Jacinto Waste Pits Superfund Site on the Internet

www.sanjacintowastepits.com or
www.epa.gov/region6/6sf/pdffiles/0606611.pdf

EPA United States Environmental Protection Agency